

THAT WHICH IS CLAIMED IS:

1. A process comprising:

introducing at least one monomer, at least one catalyst, and at least one diluent

into an olefin polymerization zone under polymerization conditions,

5 wherein the at least one monomer is polymerized to form at least one

polyolefin, and wherein the olefin polymerization zone comprises a slurry

polymerization reactor that is a loop reactor or a stirred tank reactor;

introducing at least one catalyst deactivating agent into the olefin polymerization

zone for a selected time in an amount effective to substantially deactivate

10 at least part of the at least one catalyst, whereby the polymerization of the

at least one monomer is substantially stopped or the rate of polymerization

is substantially slowed; and

restarting polymerization by introducing into the olefin polymerization zone at

least one catalyst.

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2. The process of claim 1, wherein the quantity of catalyst in the olefin

polymerization zone is determined, and based on that determination, an amount of

catalyst deactivating agent is introduced that is sufficient to substantially

deactivate the catalyst but is not more than 125% of the amount required to

20 substantially deactivate the catalyst.

3. The process of claim 2, wherein the amount of catalyst deactivating agent introduced is not more than 110% of the amount required to substantially deactivate the catalyst.
- 5 4. The process of claim 3, wherein the amount of catalyst deactivating agent introduced is not more than 105% of the amount required to substantially deactivate the catalyst.
- 10 5. The process of claim 1, wherein polymerization is restarted within about 2 to about 6 hours after the catalyst deactivating agent is introduced into the olefin polymerization zone.
- 15 6. The process of claim 5, wherein polymerization is restarted within about 2 to about 4 hours after the catalyst deactivating agent is introduced into the olefin polymerization zone.
- 20 7. The process of claim 1, further comprising:
withdrawing an effluent from the polyolefin polymerization zone, and introducing the effluent into a separation zone in which the effluent is separated into a polyolefin lean stream and a polyolefin rich stream; and
passing the polyolefin rich stream to an agglomerating zone, in which polyolefin is agglomerated.

8. The process of claim 7, wherein the polyolefin rich stream is passed directly to the agglomerating zone, without first passing through a storage zone.
9. The process of claim 7, wherein the agglomerating zone comprises an extruder,
5 and polyolefin is extruded in the agglomerating zone.
10. The process of claim 1, wherein the at least one catalyst deactivating agent comprises water, alcohol, another oxygen-containing material, or a mixture thereof.
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11. The process of claim 10, wherein the at least one catalyst deactivating agent comprises water, methanol, ethanol, propanol, ethyl acetate, acetic acid, or a mixture thereof.
- 15 12. The process of claim 1, wherein the at least one polyolefin is a homopolymer consisting essentially of polymerized monomers having from 2 to about 10 carbon atoms per molecule or a copolymer comprising at least two different polymerized monomers having from 2 to about 16 carbon atoms per molecule.
- 20 13. The process of claim 12, wherein the at least one polyolefin is a homopolymer consisting essentially of polymerized ethylene.

14. The process of claim 1, wherein the at least one catalyst is a Ziegler-Natta catalyst, Phillips catalyst, metallocene catalyst, or a mixture thereof; wherein the catalysts comprise transition metals of Groups IVB-VIII of the Periodic Table of Elements.

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15. The process of claim 1, wherein the at least one diluent is isobutane.

16. Olefin polymerization apparatus, comprising:

a slurry polymerization reactor that is a loop reactor or a stirred tank reactor,

10 wherein the reactor is suitable for polymerizing at least one monomer in the presence of at least one catalyst and at least one diluent to form at least one polyolefin, and wherein the reactor comprises at least one effluent removal conduit for removing an effluent that comprises at least one polyolefin;

15 a supply of catalyst deactivating agent operatively connected to the reactor so that catalyst deactivating agent can be introduced into the reactor at selected times and in selected quantities;

means for determining the quantity of catalyst in the reactor;

a separation zone operatively connected to the effluent removal conduit and

20 capable of separating the effluent into a polyolefin lean stream and a polyolefin rich stream, wherein the separation zone comprises at least one polyolefin rich stream removal conduit; and

an agglomerating zone operatively connected to the polyolefin rich stream
removal conduit and capable of agglomerating polyolefin from the
polyolefin rich stream.

- 5 17. The apparatus of claim 16, wherein the separation zone and the agglomerating
zone are directly connected without any intervening storage zones through which
the polyolefin rich stream must pass before entering the agglomerating zone.
18. The apparatus of claim 16, wherein the agglomerating zone comprises an
10 extruder, and polyolefin is extruded in the agglomerating zone.
19. The apparatus of claim 16, further comprising means for determining the quantity
of catalyst deactivating agent needed to substantially stop polymerization in the
reactor or to substantially slow the rate of polymerization.

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